

## CLAIMS

What is claimed is:

5 1. A helmet system for the protection of a wearer comprising:

10 a) a protective head covering, comprising

15 i) an outer shell adapted to cover a substantial portion of said wearer's head;

10 ii) a transparent face shield connected to said outer shell; and

15 iii) a cushioning element inside of said outer shell;

20 b) at least one compressed breathable supply air canister fluidically coupled to said protective head covering;

25 c) at least one safety risk factor sensor;

30 d) an air release element fluidically coupled to said at least one compressed breathable supply air canister and responsive to said safety risk factor sensor;

35 e) at least one pressurized air exfiltration element substantially fixed relative to said protective head covering.

40 2. A helmet system for the protection of a wearer as in claim 1 wherein said at least one compressed breathable supply air canister comprises a cartridge.

45 25 3. A helmet system for the protection of a wearer as in claim 1 wherein said at least one compressed breathable supply air canister comprises a tank located externally to said outer shell.

4. A helmet system for the protection of a wearer as in claim 1 wherein said compressed breathable supply air canister is fluidically coupled to a location within said protective head covering by an air transport element.

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5. A helmet system for the protection of a wearer as in claim 1 wherein said safety risk sensor comprises at least one impact sensor.

6. A helmet system for the protection of a wearer as in claim 1 wherein said air release  
10 element comprises at least one manually operable element.

7. A helmet system for the protection of a wearer as in claim 1 wherein said air release element comprises at least one electrically activatable element.

15 8. A helmet system for the protection of a wearer as in claim 1 wherein said air release element comprises a remote wireless signal response element.

9. A helmet system for the protection of a wearer as in claim 1 wherein said air release element comprises at least one mechanically activatable element.

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10. A helmet system for the protection of a wearer as in claim 2 wherein said cartridge is directly attached to said outer shell.

11. A helmet system for the protection of a wearer as in claim 1 wherein said at least one  
25 pressurized air exfiltration element comprises a flexible shroud attached along a base rim of said protective head covering.

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12. A helmet system for the protection of a wearer as in claim 1 wherein said at least one pressurized air exfiltration element comprises a pressurized air exfiltration element located at substantially the border of said face shield with said outer shell.

5 13. A helmet system for the protection of a wearer as in claim 1 wherein said at least one pressurized air exfiltration element comprises at least one hole in said outer shell.

14. A helmet system for the protection of a wearer as in claim 1 wherein said pressurized air exfiltration element comprises at least one pressure regulator.

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15. A helmet system for the protection of a wearer as in claim 2 wherein said helmet system further comprises a cartridge failure safety element.

16. A helmet system for the protection of a wearer as in claim 4 wherein said air transport element comprises a detachment element.

17. A helmet system for the protection of a wearer as in claim 1 further comprising a remote wireless sensor signal receipt element.

20 18. A method for protecting a user comprising the steps of:

- a) securing a protective head covering substantially around a user's head;
- b) providing at least one compressed breathable supply air canister fluidically coupled to said protective head covering;
- c) safety risk factor sensing;
- d) determining safety risk factor presence;

e) establishing at least one flow of breathable air from said at least one compressed breathable supply air canister in response to said step of determining safety risk factor sensing;

5 f) providing said at least one flow of breathable air to inside said protective head covering in response to said step of establishing at least one flow of breathable air;

10 g) increasing an internal head covering air pressure to above an ambient condition value in response to said step of providing said at least one supply of breathable air; and

15 h) exfiltrating gas from within said protective head covering through an exfiltration element in response to said step of increasing an internal head covering air pressure.

19. A method for protecting a user as in claim 18 wherein said step of safety risk factor sensing comprises the step of automatically sensing the presence of a safety risk factor.

20. A method for protecting a user as in claim 18 wherein said step of safety risk factor sensing comprises the step human sensing the presence of a safety risk factor.

21. A method for protecting a user as in claim 18 wherein said step of establishing at least one flow of breathable air comprises the step of manually initiating a release of said at least one flow of breathable air by a human wearer of said protective head covering in response to said step of determining safety risk factor presence.

25 22. A method for protecting a user as in claim 18 wherein said step of establishing at least one flow of breathable air comprises the step of electrically initiating a release of said at least one flow of breathable air in response to said step of determining safety risk factor presence.

23. A method for protecting a user as in claim 18 wherein said step of establishing at least one flow of breathable air comprises the step of establishing a flow of breathable air from a compressed breathable air cartridge.

5 24. A method for protecting a user as in claim 18 wherein said step of establishing a flow of breathable air from said compressed breathable air canister comprises the step of initiating a release from said flow of breathable air externally of said protective head covering.

10 25. A method for protecting a user as in claim 18 wherein said step of exfiltrating air from within said protective head covering comprises the step of exfiltrating air through a flexible shroud provided at a rim located at the base of said protective head covering.

15 26. A method for protecting a user as in claim 18 wherein said step of exfiltrating air from within said protective head covering comprises the step of exfiltrating air through a border defined by a transparent helmet face shield and an outer helmet shell.

27. A method for protecting a user as in claim 18 wherein said step of exfiltrating air from within said protective head covering comprises the step of exfiltrating air through a unitary pressure regulator.

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28. A method for protecting a user as in claim 18 further comprising the step of adjusting said exfiltration element.

29. A method for protecting a user as in claim 18 further comprising the step of providing a 25 cartridge failure safety element.

30. A method for protecting a user as in claim 18 wherein said method for protecting a user is implementable in a racing vehicle environment.

31. A method for protecting a user as in claim 18 further comprising the step of replacing an air transport element fluidically connected to said protective head covering.

32. A method for protecting a user as in claim 18 further comprising the step of wirelessly  
5 communicating.